

300 mm
200
100
50
0 10 mm

-AREA KEY-		
	Impermeable area (Sqm)	Total area (Sqm)
Area 1	2351	3848
Area 2	5349	11175
Area 3	5910	11180
Area 3	0	2500



Preliminary

1:500 @ A1
1:1000 @ A3
0 5 10 15 20 25 30 35 40 45 50 m

Revision	Amendment	Approved	Revision Date
P1	First Issue	APT	05.08.2015
P2	New client layout	APT	21.10.15



Modulus House,
Salterns Lane, Fareham
Hampshire PO16 0QS

Drawn	Designed	Approved	Revision Date
CGJ	APT	APT	05.08.2015

Project No.	Scale
E-F-1682.00	1:500

Project	
Station Road Haying Island	
Sheet	
Impermeable Areas	
Drawing No.	Sheet No.
103	01
Revision	
P2	

Date: 22/05/2015

t +44 1329 822021

f +44 1329 825274

w: www.opusinternational.co.uk

Project No.: EF1682
Project Title: Station Rd

Rectangular Infiltration Basin Assessment to CIRIA C697 Ch4.7

Infiltration to base of basin only

Site Location: Hayling Island

Catchment ID: Combined rough

r = 0.36 (range 0.12 to 0.45)

Drained Area = 14300 m²

Design storm 1 in = 100 year

Runoff volume uplift = 20 % for climate change

(Note relevant uplift applies to volume NOT peak rainfall rate)

Site Considerations

How has depth of highest seasonal groundwater level been determined?

BGS infiltration Georeport 3-5m

Where determined, what is the depth to highest seasonal groundwater level (GWL) from rim OGL

1.10 m

How far is or will it be to the closest building to the proposed basin rim?

5.10 m

Is the basin far enough from drainage mounds/fields or other soakaways etc to avoid impact?

Yes

What Source Protection Zone (SPZ) is the proposed basin located in?

None

What is known and proposed about potential contaminated ground on the site?

EA/LPA accept infiltration

What usage forms the basin catchment?

Residential driveways (& roofs)

Where catchment comprises other uses what upstream treatment is agreed?

N/A

Technical Assessment

(at rim)

Base Length L_x = 49.00 m

55

Base area = 1029.0 m²

Base Length L_y = 21.00 m

27

Design depth area = 1340.6 m²

Side slopes 1 in = 3.0

EFD area = 1412.0 m²

Design depth = 0.70 m

Rim area = 1485.0 m²

Extreme Flood Depth(EFD) = 0.85 m

Design volume = 827.0 m³

Rim freeboard above EFD = 0.15 m

EFD volume = 1033.1 m³

% Void availability = 100 %

Time to drain full to half full = 7.0 hours

Consequence of failure = 2-Minor inconvenience

Measured Soil Filtration Rate = 3.00E-05 m/s

Design Soil Filtration Rate = 1.50E-05 m/s

M5-60 Rainfall = 20 mm

Storm Duration	5 min	10 min	15 min	30 min	1 hr	2 hr	4 hr	6 hr	10 hr	24 hr
(secs)	300	600	900	1800	3600	7200	14400	21600	36000	86400
r= 0.36 Value Z1	0.36	0.51	0.62	0.79	1.00	1.22	1.48	1.67	1.90	2.42
Rainfall M5 (mm)	7.2	10.2	12.4	15.8	20.0	24.4	29.6	33.4	38.0	48.4
M100/M5 gf Value Z2	1.84	1.91	1.95	2.00	2.03	2.01	1.97	1.94	1.91	1.82
Rainfall M100 (mm)	13.3	19.5	24.2	31.5	40.6	49.1	58.4	64.9	72.4	88.2
ith climate uplift (mm)	15.9	23.4	29.0	37.9	48.7	58.9	70.1	77.9	86.9	105.9
RUNOFF (m ³)	227.7	334.9	414.6	541.3	696.7	842.6	1002.3	1113.5	1242.9	1513.9
rect plan h _{max} (m)	0.22	0.32	0.39	0.50	0.62	0.71	0.76	0.76	0.67	0.18
Max plan h _{max} (m)	0.76									
Req'd STORAGE (m ³)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	780.1	N/A	N/A

pass

Trial true h_{max} (m)

0.670 >>Vol =

787.0

Overall Assessment

Reliability of seasonal GWL determination

Fair

Basin base elevation above seasonal high GWL

0.10 m

fail

Compliance with 5.0m minimum building clearance

Yes

pass

Reliability of effective clearance from other infiltration infrastructure

Good

pass

Is the location over an SPZ?

No

Will the site be clean enough for the EA/LPA to permit infiltration?

Yes

pass

Is the proposed catchment use a low pollution risk?

Yes

If no have the EA/LPA accepted the upstream treatment proposals for runoff to the soakaway?

No

N/A

Will the soakaway drain from full to half full in 24 hours or less?

Yes

pass

Does the soakaway provide sufficient storage?

Yes

pass

Low GWL to Determine Volume → 780m³

Date: 22/05/2015

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Project No.: EF1682
Project Title: Station Rd

Rectangular Infiltration Basin Assessment to CIRIA C697 Ch4.7

Infiltration to base of basin only

Site Location: Hayling Island

r = 0.36 (range 0.12 to 0.45)

Drained Area = 14300 m²

Design storm 1 in = 100 year

Runoff volume uplift = 20 % for climate change

Catchment ID: Combined rough

(Note relevant uplift applies to volume NOT peak rainfall rate)

Site Considerations

How has depth of highest seasonal groundwater level been determined?

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Where determined, what is the depth to highest seasonal groundwater level (GWL) from rim OGL

1.10 m

How far is or will it be to the closest building to the proposed basin rim?

5.10 m

Is the basin far enough from drainage mounds/fields or other soakaways etc to avoid impact?

Yes

What Source Protection Zone (SPZ) is the proposed basin located in?

None

What is known and proposed about potential contaminated ground on the site?

EA/LPA accept infiltration

What usage forms the basin catchment?

Residential driveways (& roofs)

Where catchment comprises other uses what upstream treatment is agreed?

N/A

Technical Assessment

(at rim)

Base Length L_x = 50.50 m

55

Base Length L_y = 22.50 m

27

Side slopes 1 in = 3.0

Design depth = 0.45 m

Extreme Flood Depth (EFD) = 0.60 m

Rim freeboard above EFD = 0.15 m

% Void availability = 100 %

Consequence of failure = 2-Minor inconvenience

Measured Soil Filtration Rate = 3.00E-05 m/s

Design Soil Filtration Rate = 1.50E-05 m/s

Base area = 1136.3 m²

Design depth area = 1340.6 m²

EFD area = 1412.0 m²

Rim area = 1485.0 m²

Design volume = 556.7 m³

EFD volume = 763.0 m³

Time to drain full to half full = 6.2 hours

M5-60 Rainfall = 20 mm

Storm Duration	5 min	10 min	15 min	30 min	1 hr	2 hr	4 hr	6 hr	10 hr	24 hr
(secs)	300	600	900	1800	3600	7200	14400	21600	36000	86400
r= 0.36 Value Z1	0.36	0.51	0.62	0.79	1.00	1.22	1.48	1.67	1.90	2.42
Rainfall M5 (mm)	7.2	10.2	12.4	15.8	20.0	24.4	29.6	33.4	38.0	48.4
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Rainfall M100 (mm)	13.3	19.5	24.2	31.5	40.6	49.1	58.4	64.9	72.4	88.2
ith climate uplift (mm)	15.9	23.4	29.0	37.9	48.7	58.9	70.1	77.9	86.9	105.9
RUNOFF (m ³)	227.7	334.9	414.6	541.3	696.7	842.6	1002.3	1113.5	1242.9	1513.9
rect plan h _{max} (m)	0.20	0.29	0.35	0.45	0.56	0.63	0.67	0.66	0.55	0.04
Max plan h _{max} (m)	0.67									
Req'd STORAGE (m ³)	N/A	N/A	N/A	N/A	N/A	N/A	756.83	N/A	N/A	N/A

fail

Trial true h_{max} (m)

0.670 >> Vol =

862.9

Overall Assessment

Reliability of seasonal GWL determination

Fair

Basin base elevation above seasonal high GWL

0.35 m

fail

Compliance with 5.0m minimum building clearance

Yes

pass

Reliability of effective clearance from other infiltration infrastructure

Good

pass

Is the location over an SPZ?

No

Will the site be clean enough for the EA/LPA to permit infiltration?

Yes

pass

Is the proposed catchment use a low pollution risk?

Yes

If no have the EA/LPA accepted the upstream treatment proposals for runoff to the soakaway?

No

N/A

Will the soakaway drain from full to half full in 24 hours or less?

Yes

pass

Does the soakaway provide sufficient storage?

No

fail

High GWL provide volume upstrial from D/B m bgl

ult pit EFD = +0.6m

>17m³ volume available in soak ∴ OK.



- STANDARD NOTES:**
- This drawing is to be read in conjunction with all other OPUS drawings, and with relevant Architects and Engineer's drawings and specifications.
 - No dimensions are to be scaled from this drawing. Values stated elsewhere in all dimensions are in millimeters and all levels are in meters from the sea datum. All dimensions to be checked in situ. All details and dimensions relating to sub-Contractor work must be checked and agreed between the sub-Contractor or supplier and the general Contractor.
 - The electronic information from this drawing cannot be guaranteed to dimensionally draw notes. Exported dimensions must be used for setting out and detailing. OPCS signs and company information must be removed from copies if information is re-used.
 - The main Contractor is responsible for the design of all temporary works, and is also responsible for the safe maintenance and stability of existing buildings at all times.
 - The main Contractor is responsible for the mitigation of all occurrences of ground water during the construction period.
 - Any information given regarding existing underground services is given in good faith after consultation with the relevant authority, however accuracy is not guaranteed. The main Contractor is responsible for checking all information on site prior to work commencing and taking due care and attention whilst undertaking the works.
 - The contractor must comply with all current legislation relating to Health & Safety.
- DRAINAGE NOTES:**
- All works to be conducted in strict accordance with specification of the Local Authority, BS5931:1995 & BS5475:1.
 - All pipe runs near buildings to comply with the Building Regulations 2002 Part H1. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN2 concrete to a level below the lowest level for the foundations equal to the distance from the foundation less 100mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
 - Where pipes, external to the structures, have a depth to surface from ground level to less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
 - Where pipes are bedded and surrounded in concrete, flexible joints should be provided. Compressible boards (Bordac or polyurethane) shall be provided at a maximum of 8m centres, including with pipe joints. The boards shall be set to pipe diameter and to a height and width equal to the concrete cross section. A board thickness of 18mm for pipes up to 450mm nominal diameter and 24mm for pipes over 450mm nominal diameter.
 - All private building drainage shall be constructed in strict accordance with BS2752:1.
 - Unless otherwise specified, building drainage to be 100mm internal diameter.
 - Minimum gradients for 100mm surface drainage pipes is 1:40, and 150mm is 1:100.
 - Minimum gradients for foul drainage pipes:
100mm: 1:80 where flow is less than 10l/s, or where no WCs are connected.
100mm: 1:28 where flow is 10l/s or greater, or where at least 2 WCs are connected.
150mm: 1:135 where flow is less than 20l/s, or where up to 2 WCs are connected.
150mm: 1:150 where flow is 20l/s or greater, or where 3 WCs or more WCs are connected.
 - All gullies not connected to inspection chambers are to be roddable.
 - All gully connections other than those at manholes to be made via "Y" junctions.
 - Gullies connected with pedestrian/drive crossings to have pedestrian type gully covers.
 - All roof gully connections to be 100mm diameter.
 - All sub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to be installed with roof tile vents.
 - All connections to be made from soffits to soffits.
 - Trench temporary framework is required to all excavations exceeding 1.2m depth to provide adequate support and stability at all times.
 - Sewers are to be constructed in single sections between manholes only. Trenches to be backfilled prior to excavating the succeeding sewer run.
 - All cover and concrete products to be in accordance with BRE 363 for subsoils.
 - Where sewer or drains are to be abandoned they shall be removed or filled by grouting in accordance with the Civil Engineer Specification for the Water Industry 7th Edition, clause 523.

BACKGROUND IS BASED ON THE ARCHITECTS GA DRAWING

ANY DISCREPANCIES OR UNCERTAINTY WITH THE CONTENT OF THIS DRAWING ARE TO BE REPORTED TO THE ENGINEER PRIOR TO CONSTRUCTION.

- LEGEND:**
- | | | | |
|----------|---|----------|--|
| (74.975) | PROPOSED FOUL MANHOLE WITH INVERT LEVEL ON ADAPTABLE SEWER. | (74.975) | PROPOSED STORM MANHOLE WITH INVERT LEVEL ON ADAPTABLE SEWER. |
| (74.975) | PROPOSED TYPE 3 FOUL PPIC WITH INVERT LEVEL ON ADAPTABLE SEWER. | (74.975) | PROPOSED TYPE 3 STORM PPIC WITH INVERT LEVEL ON ADAPTABLE SEWER. |
| (74.975) | PROPOSED TYPE 3 FOUL PPIC ON PRIVATE DRAIN. | (74.975) | PROPOSED TYPE 3 STORM PPIC ON PRIVATE DRAIN. |
| (74.975) | PROPOSED TYPE 4 FOUL PPIC WITH INVERT LEVEL ON ADAPTABLE LATERAL. | (74.975) | PROPOSED TYPE 4 STORM PPIC WITH INVERT LEVEL ON ADAPTABLE LATERAL. |
| (74.975) | PROPOSED TYPE 4 FOUL PPIC ON PRIVATE DRAIN. | (74.975) | PROPOSED TYPE 3 STORM PPIC ON PRIVATE DRAIN. |
| + 97.030 | PROPOSED SPOT LEVEL. | (74.975) | PROPOSED STORM MANHOLE WITH INVERT LEVEL ON PRIVATE DRAIN. |
| | PROPOSED STORM WATER SCUPPER. | (74.975) | PROPOSED PERFORATED PRIVATE DRAIN PIPE (BLOCK PAVED AREAS ONLY). |

PRELIMINARY

Revision	Amendment	Approved	Revision Date
P3	NEW CLIENT LAYOUT	APT	21.10.2015
P2	LAYOUT UPDATE AND DRAINAGE MODIFIED	APT	11.08.2015
P1	FIRST ISSUE	APT	04.08.2015



OPUS
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Modulus House,
Sellers Lane, Fareham
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Drawn	Designed	Approved	Revision Date
CAA	CAA	APT	04.08.2015

Project No. FA E-F1602.00 Scale 1:250

Project Station Road, Haying Island

Sheet DRAINAGE STRATEGY

Drawing No.	Sheet No.	Revision
001	1 of 1	P3

Date: 15/08/2015

t: +44 1329 822021
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Project No

EF1682

Site Ref

Station Road

Catchment Reference

Gross

Land Use Pollution Factors (LUPF)

	default	use	code
Commercial pavements	4.5	4.5	CMPPA
Commercial roofs	2.0	2.0	CMRF
Industrial pavements	4.0	4.0	INPA
Industrial roofs	3.0	3.0	INRF
Residential pavements	2.5	2.5	REPA
Residential roof	1.0	1.0	RERF

Gross development area 2.60 Ha

Development Scale Factor (DSF)

	default	use
gross area <= 10 Ha	1	1
gross area > 10 Ha	2	2

DSF = 1

Receptor Sensitivity Index (RSI)

	default	use
Stream/HQ rivers	3	3
Large river/LQ stream	2	2
Sea/Estuary	1	1

Receptor Stream/HQ rivers
RSI = 3

Sustainability Index (SI)

	default	use
WQS < 0.8	1	1
0.8 < WQS <= 1.0	2	2
1.0 < WQS <= 1.5	3	3
1.5 < WQS <= 3.0	4	4
WQS > 3.0	5	5

Where WQS= Water Quality Score (page 2)

Treatment Train Receptor (TTR)

Outfalls to surface water	OUTF
Discharges to ground	GRND

Treatment Quality Factors (TQF)

Technique	clean & low GW		High GW or contam		code
	default	use	default	use	
Bioretention	0.20	0.20	1.00	1.00	BIO
Detention basins-lined	0.50	0.50	0.50	0.50	DBL
Detention basins-unlined	0.30	0.30	1.00	1.00	DBU
Filter Strips	0.60	0.60	1.00	1.00	FST
Filter trenches	0.50	0.50	1.00	1.00	FTR
Green roofs	0.50	0.50	0.50	0.50	GRF
Infiltration basin	0.01	0.01	1.00	1.00	INB
Infiltration trenches	0.01	0.01	1.00	1.00	INT
Oil interceptors	0.80	0.80	0.80	0.80	OIL
Pervious Pavements-lined	0.30	0.30	0.30	0.30	PAL
Pervious Pavements-unlined	0.20	0.20	1.00	1.00	PAU
Ponds	0.30	0.30	0.30	0.30	PON
Sedimentation Units	0.70	0.70	0.70	0.70	SED
Soakaways	0.01	0.01	1.00	1.00	SOA
Swales	0.40	0.40	0.60	0.60	SWA
Wetlands-lined	0.30	0.30	0.30	0.30	WLL
Wetlands-unlined	0.20	0.20	1.00	1.00	WLU
zero (dummy unit)	1.00	1.00	1.00	1.00	ZERO

Methodology

The methodology is contained on the UKSuDS website [www // geoservergisweb2. hrwallingford .co .uk /uksd /tool:](http://www.geoservergisweb2.hrwallingford.co.uk/uksd/tool/)

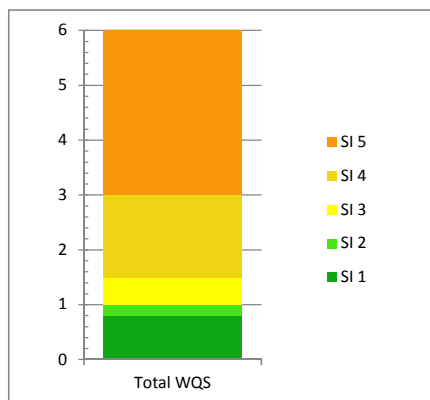
This tool is aimed at providing a qualitative assessment of the treatment effectiveness of the surface water drainage system. The performance indicator score is a function of the site characteristics and the sensitivity of the receiving environment and in this regard reflects best practice required by the Environment Agency. It uses research data on the characteristics of urban runoff and the effectiveness of different drainage components in managing different suites of contaminants, to guide the user towards optimum treatment train configurations for their development site.

Date: 15/08/2015

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Area ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Use code	CMRF	CMPA	RERF	REPA	REPA	RERF	RERF	CMPA	CMPA	CMPA	CMPA	CMPA	CMPA	CMPA	CMPA	CMPA
LUPF	2	4.5	1	2.5	2.5	1	1	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
High GW?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Contam?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Area (Ha)	0.1	0.135	0.59	1.77	0	0	0	0	0	0	0	0	0	0	0	0
% Imperv	100	47	100	36	100	100	100	100	100	100	100	100	100	100	100	100
Tech 1	OIL	OIL	SWA	SWA	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO
TQF1	0.80	0.80	0.40	0.40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Tech 2	SWA	SWA	INB	INB	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO
TQF2	0.40	0.40	0.01	0.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Tech 3	INB	INB	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO
TQF3	0.01	0.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Receptor	OUTF	OUTF	OUTF	OUTF	OUTF	OUTF	OUTF	OUTF	OUTF	OUTF	OUTF	OUTF	OUTF	OUTF	OUTF	OUTF
WQS _{SUDS}	0.02	0.03	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WQS _{trad}	0.20	0.29	0.59	1.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Total WQS_{SUDS} = 0.30

Sustainability Index = 1

overall PIMP = 54%

Total WQS_{traditional} = 5.76

Sustainability Index = 5